

R0E330850ACBP0

Protection Board for M16C/60 Series M16C/62P Group and M32C/80 Series Emulator

User's Manual

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1. Outline

The R0E330850ACBP0 is a protection board for the M16C/60 Series M16C/62P Group and M32C/80 Series emulator. This product protects the emulator from improper connections by connecting to between the converter board and emulator. This product is designed to protect the emulator from troubles caused by applying overvoltage to port pins. Note that it cannot protect the emulator when applying overvoltage or reverse voltage to the power pins, or applying more voltage than the allowable voltage to each pin.

2. Package Components (See Figure 1)

- (1) R0E330850ACBP0 protection board 1pc.
- (2) R0E330850ACBP0 User's Manual (This manual) 1pc.
- (2) R0E330850ACBP0 User's Manual (Japanese)..... 1pc.

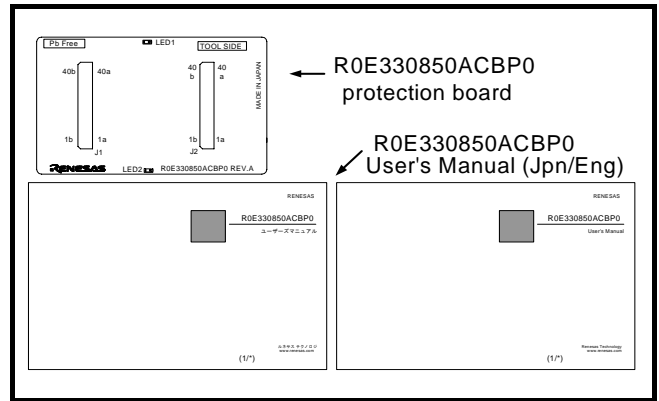


Figure 1 Package components of the R0E330850ACBP0

3. Specifications

Table 1 Specifications

Applicable products	M30830T-EPB, M30850T2-EPB, M30870T-EPB, M30880T-EPB, M3062PT2-EPB, M30850T3-CPE, M30870T2-CPE, M3062PT3-CPE
Interface connectors	80pin 0.8mm pitch (Matsushita Electric Works, Ltd.)
Vcc	3.0 - 5.5 V (When the power pin Vcc1 is set to 5.6 V or more, LED1 and LED2 light.)
Protect function	Overvoltage: When applying voltage up to +10 V, the input voltage is limited by a diode. Reverse voltage: When applying voltage up to -10 V, the input voltage is limited by a diode. Over current: When the signal is short-circuited, the current is limited.
Protected pins*	Signal input/output pins except pins below. Pins not protected: Vcc1, Vss1, Vcc2, Vss2, AVcc, VREF and AVss (Note that pins of BYTE, CNVss, P70 and P71 are not protected against overvoltage)
Icc	Max.120 mA (without error) *Power is supplied from the Vcc1 pin of the user system
Insertion/removal iterations of connector	50 times guaranteed

* About protections of each pin, see "Table 2 Correspondence of the connectors".

Examples to be protected

- Connection between a port and +10[V] signal
- Short-circuiting between a port and ECL (-5.5[V]) output signal
- Short-circuiting between output ports or between an output port and the power supply

Examples NOT to be protected

- Applying +9[V] to the power supply
- Connection between a port and +24[V] signal

4. Connection Procedure (See Figure 2)

The procedure for connecting this product is shown below.

- (1) Check that neither the RVC12 nor RVS12 on this product has been disconnected using a tester.

- When the RVC12 and RVS12 are disconnected, this product may have been damaged because of overload. Do not connect this product with the emulator or user system. As the emulator may also have been damaged, make a request for inspection of it.

- (2) Mount this product on the converter board. Make sure NOT to use this product without the user system. Install the connectors as follows.

Converter board CN1 = J3 of this product
 Converter board CN2 = J4 of this product

- Check to see if power is off.
 - Do not attach this product between the PCA7501EPBA board and the M3T-FLX160-EPB.
 - Be sure not to attach the board in a wrong direction.

- (3) Mount the emulator on this product. Install the connectors as follows.

Emulator J3 = J1 of this product
 Emulator J4 = J2 of this product

Before using this product, be sure to read "5. Precautions" on the next page.

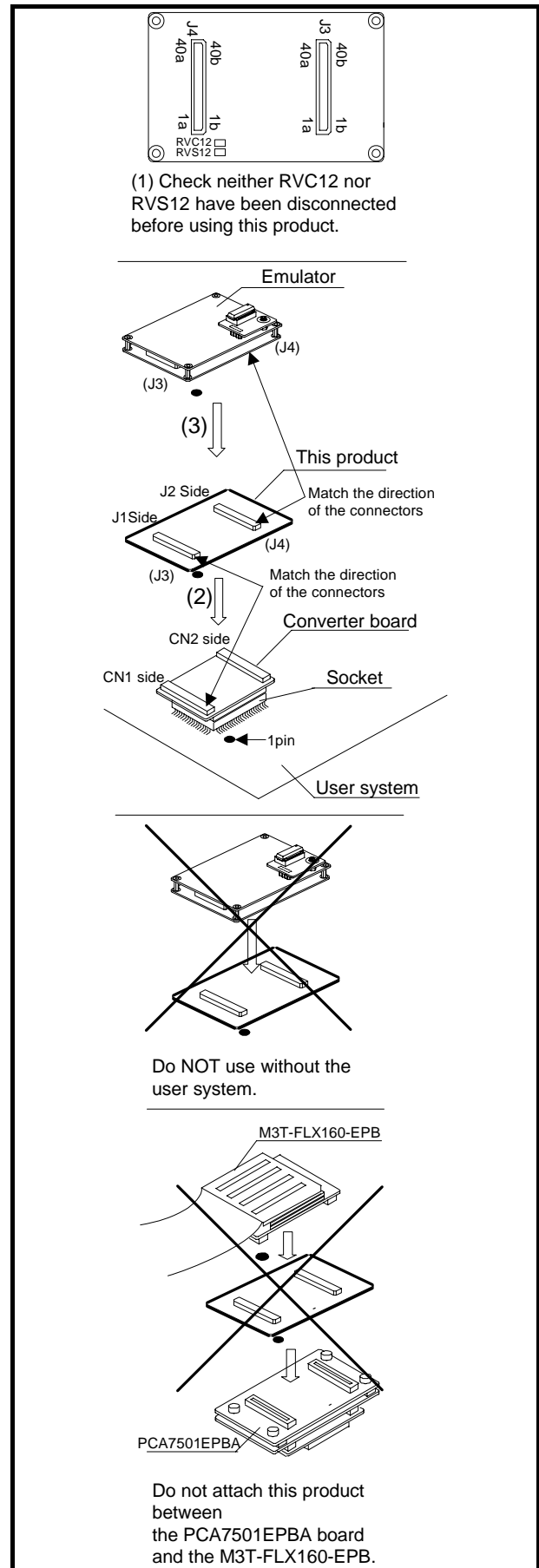


Figure 2 Connection procedure of the ROE330850ACBP0

5. Precautions

⚠ CAUTION

Caution to Be Taken for This Product:



- Be sure to connect this product to the user system, and supply power from the Vcc1 pin.
- Use the power pin Vcc1 with 5.5 V or less. If the Vcc1 pin is set to 5.6 V or more accidentally, the LED1 and LED2 will light up to notify it. If the LEDs light up, turn the power off immediately.
- If the pins protected against overvoltage are overvoltage, the voltage of the Vcc1 pin may rise up to 5.6 V because of reverse current. When you need to maintain the Vcc1 pin voltage of the user system, add dummy resistance and voltage regulator diode to the power line of the Vcc1. (Figure 3 is a mounting example.)
- Do NOT touch this product while powering on. Part of the circuit may be at a high temperature immediately after turning off the emulator. Please take some time to let it cool down before touching this product.

IMPORTANT

Notes on This Product:

- It does not provide any guarantees to protect the emulator from any possible improper connection with the user system. For details, refer to the specifications.
- When using this product, the electrical characteristics change slightly compared with when not using it. For final evaluation or characteristics verification, use the evaluation MCU.
- We cannot accept any request for repair. When requesting for repair of the emulator used with this product, refer to “7. Troubleshooting” on page 6.
- For inquiries about the product or the contents of this manual, contact your local distributor.

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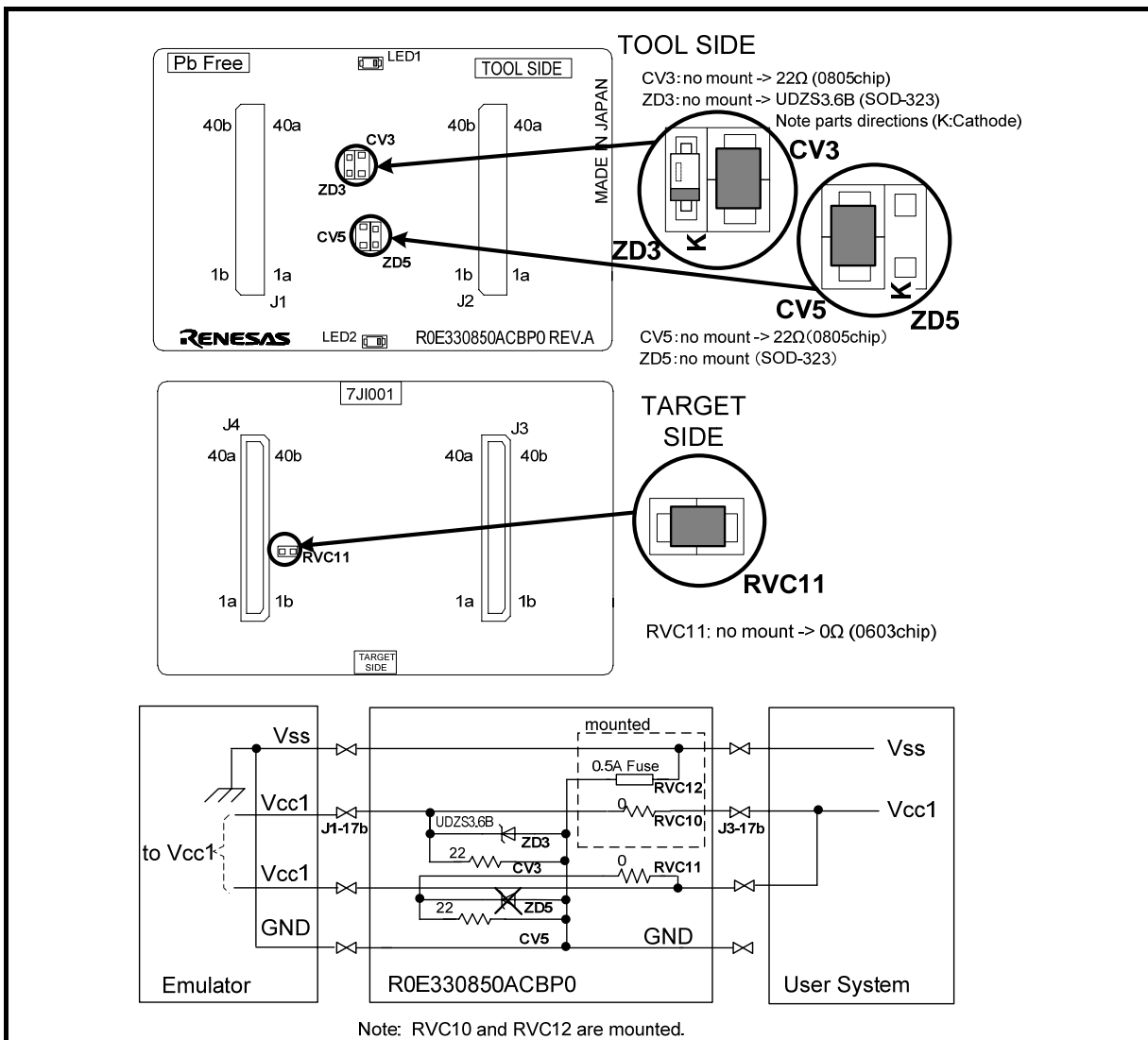


Figure 3 Example of component mounting (When restricting the voltage to 3.6 V or less in the 3.3 V user system)

6. Correspondence of Connectors

Table 2 Correspondence of the connectors

(The following signals are for the M32C/87 Group)

No.	Signals	Protections	No.	Signals	Protections	No.	Signals	Protections	No.	Signals	Protections
J3-1a	GND	-	J3-1b	P86	V+,V-,I	J4-1a	GND	-	J4-1b	RESET#	V+,V-,I
J3-2a	P87	V+,V-,I	J3-2b	CNVss	V-,I	J4-2a	XOUT	V+,V-,I	J4-2b	Vss1 *	-
J3-3a	BYTE	V-,I	J3-3b	P140	V+,V-,I	J4-3a	XIN	V+,V-,I	J4-3b	Vcc1 *	-
J3-4a	P141	V+,V-,I	J3-4b	P142	V+,V-,I	J4-4a	P85	V+,V-,I	J4-4b	P84	V+,V-,I
J3-5a	P143	V+,V-,I	J3-5b	P144	V+,V-,I	J4-5a	P83	V+,V-,I	J4-5b	P82	V+,V-,I
J3-6a	P145	V+,V-,I	J3-6b	P146	V+,V-,I	J4-6a	P81	V+,V-,I	J4-6b	P80	V+,V-,I
J3-7a	P90	V+,V-,I	J3-7b	P91	V+,V-,I	J4-7a	P77	V+,V-,I	J4-7b	P76	V+,V-,I
J3-8a	P92	V+,V-,I	J3-8b	P93	V+,V-,I	J4-8a	P75	V+,V-,I	J4-8b	P74	V+,V-,I
J3-9a	P94	V+,V-,I	J3-9b	P95	V+,V-,I	J4-9a	P73	V+,V-,I	J4-9b	P72	V+,V-,I
J3-10a	P96	V+,V-,I	J3-10b	GND	-	J4-10a	P71	V-,I	J4-10b	GND	-
J3-11a	GND	-	J3-11b	P97	V+,V-,I	J4-11a	GND	-	J4-11b	P70	V-,I
J3-12a	AVcc	V~	J3-12b	VREF	V~	J4-12a	P67	V+,V-,I	J4-12b	Vcc1	-
J3-13a	P100	V+,V-,I	J3-13b	AVss	V~	J4-13a	P66	V+,V-,I	J4-13b	Vss1	-
J3-14a	P101	V+,V-,I	J3-14b	P102	V+,V-,I	J4-14a	P65	V+,V-,I	J4-14b	P64	V+,V-,I
J3-15a	P103	V+,V-,I	J3-15b	P104	V+,V-,I	J4-15a	P63	V+,V-,I	J4-15b	P62	V+,V-,I
J3-16a	P105	V+,V-,I	J3-16b	P106	V+,V-,I	J4-16a	P61	V+,V-,I	J4-16b	P60	V+,V-,I
J3-17a	P107	V+,V-,I	J3-17b	Vcc1	-	J4-17a	P137	V+,V-,I	J4-17b	P136	V+,V-,I
J3-18a	P150	V+,V-,I	J3-18b	Vss1	-	J4-18a	P135	V+,V-,I	J4-18b	P134	V+,V-,I
J3-19a	P151	V+,V-,I	J3-19b	P152	V+,V-,I	J4-19a	P57	V+,V-,I	J4-19b	P56	V+,V-,I
J3-20a	P153	V+,V-,I	J3-20b	GND	-	J4-20a	P55	V+,V-,I	J4-20b	GND	-
J3-21a	GND	-	J3-21b	P154	V+,V-,I	J4-21a	GND	-	J4-21b	P54	V+,V-,I
J3-22a	P155	V+,V-,I	J3-22b	P156	V+,V-,I	J4-22a	P133	V+,V-,I	J4-22b	Vss2	-
J3-23a	P157	V+,V-,I	J3-23b	P00	V+,V-,I	J4-23a	P132	V+,V-,I	J4-23b	Vcc2	-
J3-24a	P01	V+,V-,I	J3-24b	P02	V+,V-,I	J4-24a	P131	V+,V-,I	J4-24b	P130	V+,V-,I
J3-25a	P03	V+,V-,I	J3-25b	P110	V+,V-,I	J4-25a	P53	V+,V-,I	J4-25b	P52	V+,V-,I
J3-26a	P111	V+,V-,I	J3-26b	P112	V+,V-,I	J4-26a	P51	V+,V-,I	J4-26b	P50	V+,V-,I
J3-27a	P113	V+,V-,I	J3-27b	P114	V+,V-,I	J4-27a	P127	V+,V-,I	J4-27b	P126	V+,V-,I
J3-28a	P04	V+,V-,I	J3-28b	P05	V+,V-,I	J4-28a	P125	V+,V-,I	J4-28b	P47	V+,V-,I
J3-29a	P06	V+,V-,I	J3-29b	P07	V+,V-,I	J4-29a	P46	V+,V-,I	J4-29b	P45	V+,V-,I
J3-30a	P10	V+,V-,I	J3-30b	GND	-	J4-30a	P44	V+,V-,I	J4-30b	GND	-
J3-31a	GND	-	J3-31b	P11	V+,V-,I	J4-31a	GND	-	J4-31b	P43	V+,V-,I
J3-32a	P12	V+,V-,I	J3-32b	P13	V+,V-,I	J4-32a	Vcc2	-	J4-32b	P42	V+,V-,I
J3-33a	P14	V+,V-,I	J3-33b	P15	V+,V-,I	J4-33a	Vss2	-	J4-33b	P41	V+,V-,I
J3-34a	P16	V+,V-,I	J3-34b	P17	V+,V-,I	J4-34a	P40	V+,V-,I	J4-34b	P37	V+,V-,I
J3-35a	P20	V+,V-,I	J3-35b	P21	V+,V-,I	J4-35a	P36	V+,V-,I	J4-35b	P35	V+,V-,I
J3-36a	P22	V+,V-,I	J3-36b	P23	V+,V-,I	J4-36a	P34	V+,V-,I	J4-36b	P33	V+,V-,I
J3-37a	P24	V+,V-,I	J3-37b	P25	V+,V-,I	J4-37a	P32	V+,V-,I	J4-37b	P31	V+,V-,I
J3-38a	P26	V+,V-,I	J3-38b	P27	V+,V-,I	J4-38a	P124	V+,V-,I	J4-38b	P123	V+,V-,I
J3-39a	Vss2	-	J3-39b	P30	V+,V-,I	J4-39a	P122	V+,V-,I	J4-39b	P121	V+,V-,I
J3-40a	Vcc2	-	J3-40b	GND	-	J4-40a	P120	V+,V-,I	J4-40b	GND	-

Notes:

-: No protection (direct-coupled), *: Feeding point

V~: No protection

(When the voltage is set to -1.0 V or less, the signal will be short-circuited to Vss by a diode on the protection board. When the voltage is set to "Vcc1 + 1.0" V or more, the signal will be short-circuited to Vcc1 by a diode on the protection board.)

V+: Overvoltage protection (Protects the emulator from being applied overvoltage from "Vcc1 + 1.0" V to +10 V.)

V-: Reverse voltage protection (Protects the emulator from being applied reverse voltage from negative voltage -1.0 V to -10 V.)

I: Over current protection

GND is a ground signal of the connector. When connecting to the emulator, it is connected to Vss inside the emulator.

7. Troubleshooting

If you have trouble when using this product with connected to the emulator, refer to the following procedures.

Table 3 Items to check when having trouble with this product used

Type	Problems	Items to check
Improper use	Used without the user system.	After turning off the power, verify that this product is connected to the user system, and then use it.
	Installed on a wrong position.	This product and the emulator may have been damaged due to improper use of this product. Turn the power off immediately and disconnect this product and the emulator. Make a request for support or repair according to the procedure shown in Figure 4. Add the detailed information about the improper use to the column of Cause of fault in the Repair Request Sheet.
	Applied more than 5.5[V] voltage or reverse voltage to the power pin Vcc1/Vss1.	
	Applied more than 10[V] of voltage or more than -10[V] of reverse voltage to each pin other than the power pins.	
Error	Error was detected by the self-check of the emulator.	Check to see if this product is disconnected to the emulator. When the product is connected to the emulator, after turning off the power and disconnecting it, execute the self-check of the emulator again. See the chapter of the Self-check in the user's manual of the emulator. The self-check needs to be performed with the emulator disconnected from the product.
	LED of this product lights up.	It indicates that abnormal voltage is being supplied. Turn the power off immediately and disconnect this product and the emulator. Check the connection between the emulator and the user system, the power supply voltage, and inadequateness or misuse of the user system.
	FUSE of this product is disconnected.	This product is damaged due to the overload that exceeded the allowable limit of this product. The emulator may also have been damaged. Make a request for support or repair according to the procedure shown in Figure 4.

When requesting for support or repair, please inform us of this product being used. If you request repair for the emulator used with this product, send us both the emulator and this product (We cannot accept any request for repair of this product).

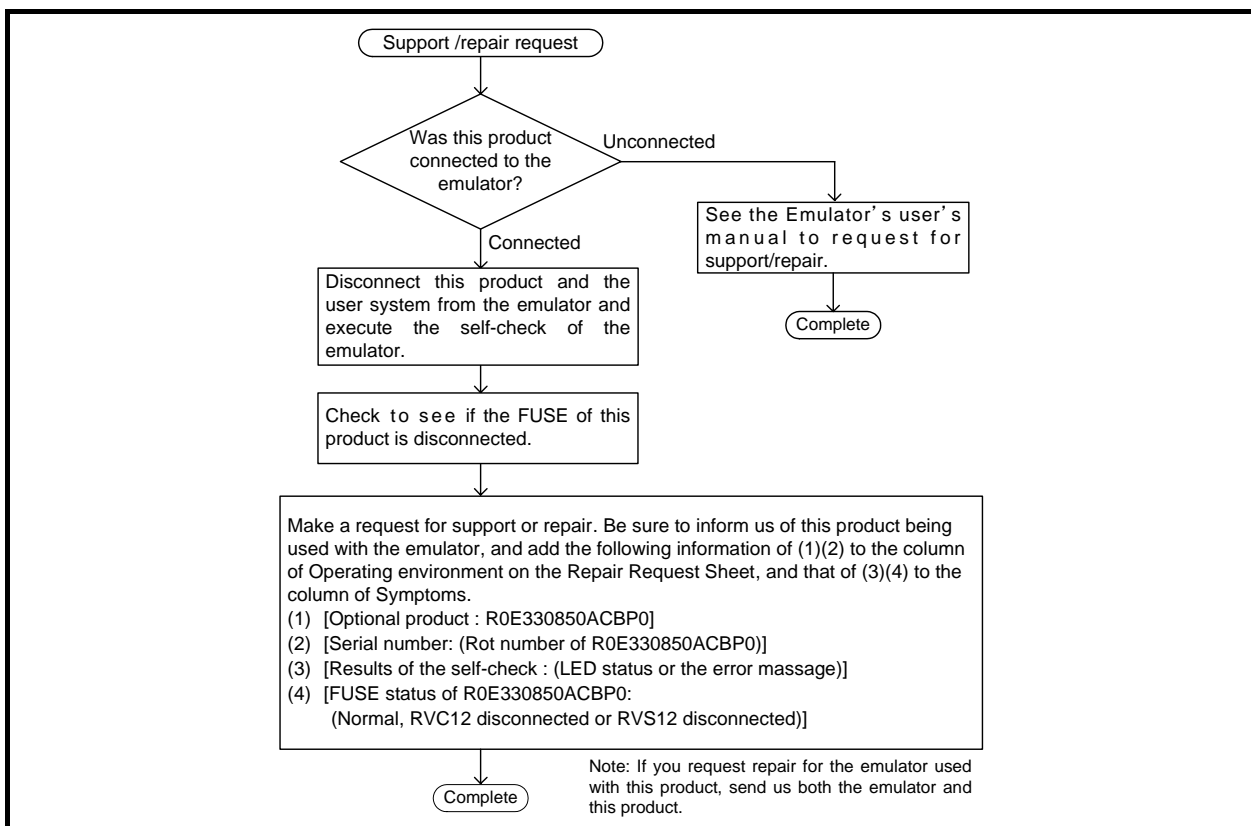


Figure 4 Support/repair request flow when using this product

8. Appendix

Table 4 Correspondence of part numbers and signals

Signals	J1J2side resistors	Diode	J3J4 side resistors	Remark
CNVss	RCNV1	(DCNV1), D87	RCNV2	DCNV1 unmount
BYTE	RBYT1	(DBYT1), D94	RBYT2	DBYT1 unmount
RESET#	RRES1	DRES1	RRES2	
XIN	RXIN1	DXIN1	RXIN2	
XOUT	RXO1	DXO1	RXO2	
P00-P07	N6,N17	D10,D13,D21,D56,D68,D73	N42,N50	
P10-P17	N3,N10	D1,D7,D14,D49,D55,D59	N38,N45	
P20-P27	N1,N7	D2,D8,D46,D47,D48,D51	N35,N41	
P30-P37	N5,N8,R3	D6,D30,D43,D53,D54	N36,N40,R15	
P40-P47	N11,N15	D15,D19,D23,D58,D61,D65	N44,N48	
P50-P57	N12,N20	D12,D20,D24,D52,D57,D66	N43,N51	
P60-P67	N23,N26	D28,D31,D69,D78.D82,D74	N54,N57	
P70,P71	N29	(D86), D36,D89	N60	D86 unmount
P72-P67	N29,N31	D36,D37,D42,D89,D92	N60,N63	
P80-P85	N28,N33	D35,D41,D83,D93	N61,N66	
P86	R11	D94	R18	
P87	R12	D87	R17	
P90-P97	N25,N30	D30,D38,D79,D80,D88,D95	N58,N64	
P100-P103 P105-P107	N21,N24	D26,D29,D32,D34,D72,D76,D85,D91	N56,N59	
P104	R10	D34	R16	
P110-P114	N13,N14	D17,D18,D62,D63	N46,N49	
P120-P127	N2,N4,N9	D4,D5,D9,D44,D45,D50	N34,N37,N39	
P130-P137	N16,N22	D16,D27,D60,D64,D70,D75	N47,N55	
P140-P146	N27,N32	D33,D39,D40,D84,D90	N62,N65	
P150-P157	N18,N19	D25,D67,D71,D77,D81	N52,N53	
AVcc	RAVC1	DAVC1	RAVC2	0ohm
VREF	RVRF1	D32,D91	RVRF2	0ohm
AVss	RAVS1	D32,D91	RAVS2	0ohm
Vcc1	-	-	RVC12	See Figure 5
	-	-	RVC10	See Figure 5
	-	-	(RVC11)	See Figure 5
Vcc2	RVC2	-	-	0ohm
Vss	-	-	RVS12	See Figure 5
	-	-	-	See Figure 5

Notes) - : No mount position, (...): Unmount

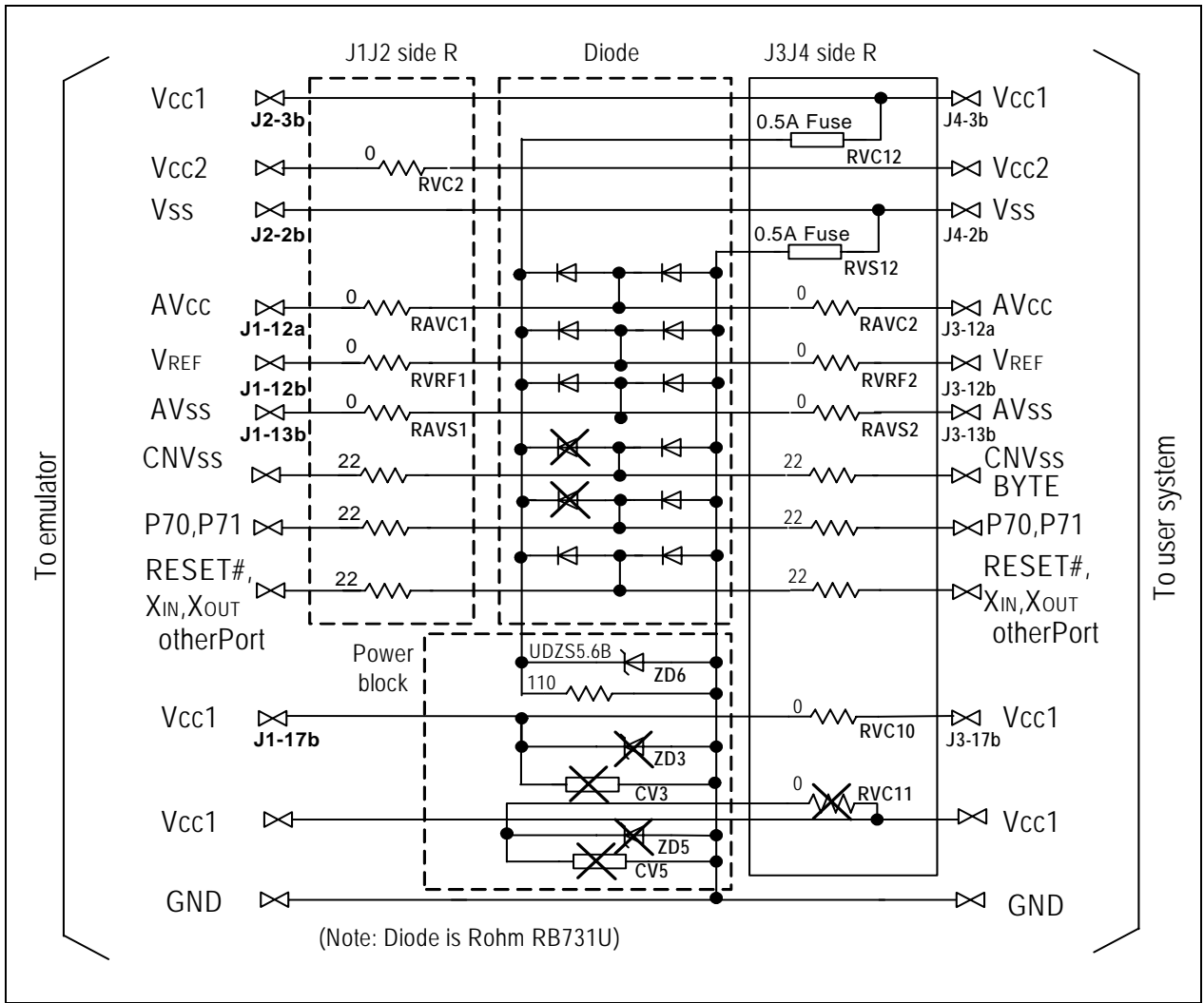


Figure 5 Connection diagram